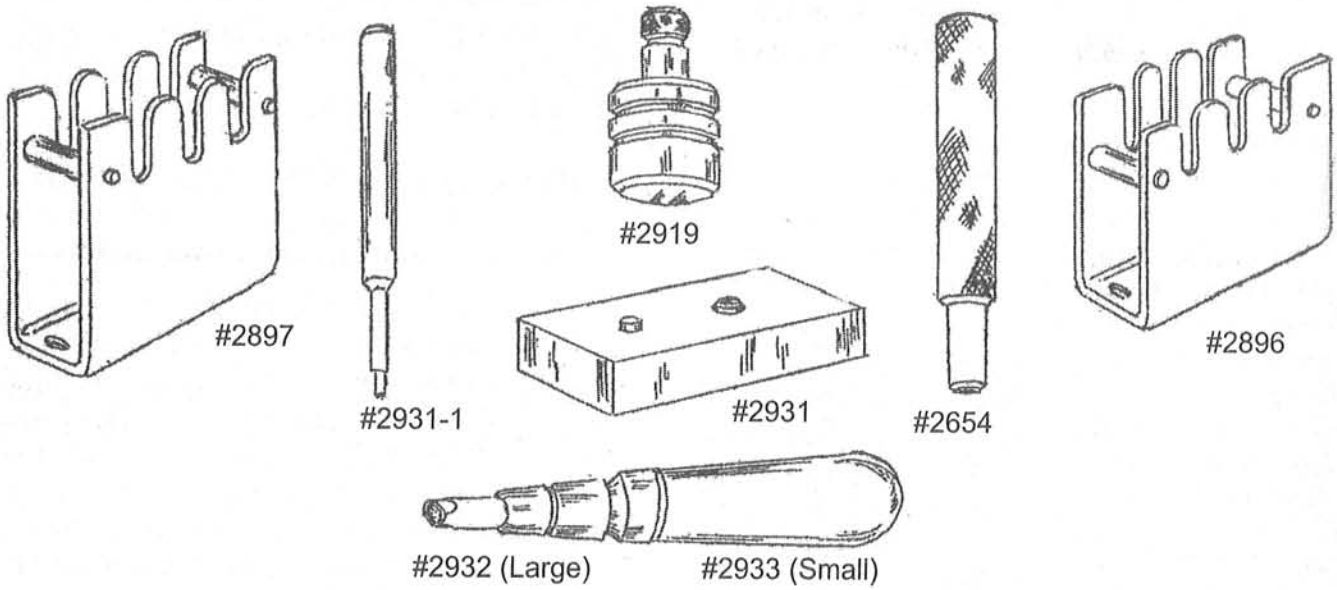
TRICO
WIPER SERVICE & REPAIR

They look so simple. Why shouldn't we be able to repair our own windshield wipers? Well, as I think that you will find in reading this article, the windshield wiper motor is a more complicated and complex unit than we can picture from merely looking at the case. No, we don't advocate doing your own repairs of adjustments unless you have the proper tools and parts. I believe that you will find that the necessary parts are more complex than you imagined. We can recommend a source for repair. That information appears at the end of this article.

The following article has been extracted from the Trico catalog for 1926-1936. It is obviously targeting the wiper service professionals - the Trico Authorized Service stations.

Editor



Service Tools

The fact that the windshield wiper unit looks okay to repair has tempted mechanics all over the United States to do patch-up jobs. As a result car owner customers from whom we must all derive our profit and our business have been "fifty-cents'd" to death, but have seldom located a service station where a dependable repair can be performed. In spite of the apparent simplicity of construction, it is absolutely necessary to use factory manufactured tools to check old parts and to ensure satisfactory installation of new elements. On this chart you will find the tools which experience has proven to be absolutely necessary to handle the repairs of a Trico vacuum operated wiper.

"Go-No-Go" Tool – No. 2919

Notice tool #2919 in the top center position on the chart, The Trico Engineering Department has named this the "Go-No-Go" because it determines accurately whether the width of the old wiper housing is correct; --- too wide --- too narrow.

Variation in the inside diameter of the wiper housing will cause leakage and loss of power. To save time and the repetition of labor, check each old wiper housing before new parts are installed. If this procedure is not carried through properly, it is impossible to guarantee perfect operation of the new parts.

Make sure that the repair jobs you perform on Trico Wipers will stand up. Faulty operation of wipers you have repaired will break down the reputation of your station as a specialist.

JIG AND PUNCHES FOR PADDLE REMOVAL AND RE-INSTALLATION

Renewal service on paddle and shaft assemblies is made easy and efficient by the use of the special Jig #2931; the Punch #2931-1 for removing the rivet which attaches the paddle to the old shaft; and the Punch #2654 for seating the new rivet on a new paddle assembly.

NOTE: See full details on paddle service - Page #33.

By using the Jig #2931, it is possible to prevent distortion of the shaft at the time the old rivet is removed with Punch #2931-1 and the new one installed with Punch #2654. Wipers cannot work satisfactorily with a distorted shaft. If the new rivet is not driven tight, vacuum can leak through the paddle and cause loss of power.

PADDLE FORMING TRAYS
#2896 For Small Wipers
#2897 For Heavy Duty Super Motors

The Forming Trays as illustrated are provided for both the large and the small wiper units. They are constructed with a diameter which is slightly larger than that of the wiper housing. The edges are also rounded so that as the new paddle is pressed into the tray the likelihood of damage to the surface is practically eliminated.

Paddle Forming Trays are absolutely necessary in the preparation of a new blackhide paddle for installation in an old wiper housing. Blackhide paddles are used in all Trico wipers built since 1931. The blackhide paddles have been designed with an almost piston fit in the housing, and unless they are given a very careful preliminary forming it is easy to scrape, scratch or tear the shiny surface of the blackhide material. Any damage of this kind will certainly result in leakage and loss of power.

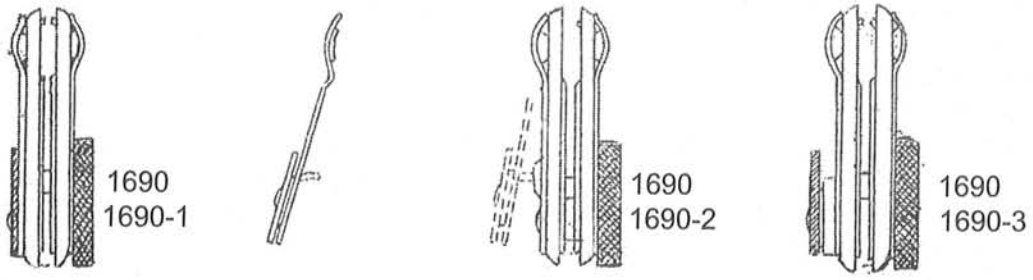
After a new blackhide paddle is installed on a wiper shaft insert the paddle vertically into the Forming Tray. Press down firmly. The slots in the top of the Forming Tray are designed to line up the wiper shaft and insure a perfect form in the flexible leaves of the paddle.

WRENCH FOR TOP COVER SCREWS
#2932 For Large Top Cover Screws
#2933 For Small Top Cover Screws

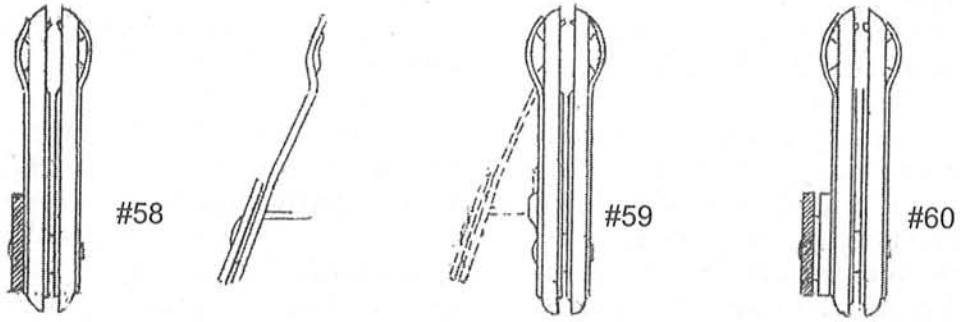
A special lug type top cover screw is used in the assembly of Trico units. This particular screw is used because of the fact that during the course of assembly in the Trico Plant these screws are tightened by the use of friction driven machines. In reassembling a repaired unit it is essential that each of these lug type screws be drawn tight. Make use of the wrench provided for this purpose and tighten the screws across the center of the wiper first, then the screws on either end. By following this procedure you will eliminate the possibility of twisting the cover with the motion of the screw so that it will rise up on a dowel pin and possibly turn a burr as the cover is drawn into place.

PADDLES

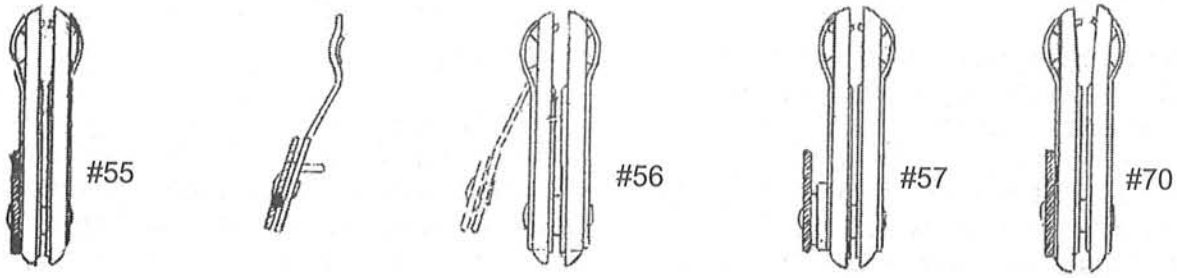
LEATHER PADDLES FOR SMALL MOTORS



BLACKHIDE PADDLES FOR SUPER HEAVY DUTY MOTORS



BLACKHIDE PADDLES FOR SMALL MOTORS



The most essential individual part in the assembly of a windshield wiper is the part which Trico terms "the paddle".

The paddle is the movable piston installed in the die cast housing, dividing the cleaner into two air tight compartments. By means of valve operation, air is drawn from one side of the paddle; atmospheric pressure on the other drives the paddle toward the side of the wiper from which the air has been removed, The shaft to which the paddle is attached naturally turns with this motion of the paddle assembly and in turn the arm and blade move in the arcuate wiper action which we see on the windshield. Naturally, defects in paddle performance will show up immediately in the action of the blade on the windshield.

The flexible leaves of the paddle, which provide the airtight dividing walls between the two sides of the wiper housing, have been built of two different types of material. The original paddles manufactured by Trico and in fact all of those built up to 1931, used a very high-grade scived* leather. To keep these leather paddles, which are illustrated in the top row of this chart, in perfect condition, it was necessary to lubricate with light non-freezable oil at regular intervals. The fact that few service stations and fewer car owners took the time to oil the windshield wipers resulted in a general demand on the part of the car manufacturers for a type of paddle construction which would eliminate this service requirement.

After the leathers have been permitted to run dry in the wiper they will take a very definite set permitting leakage and loss of power. The only certain way to ensure satisfactory operation of a wiper when the paddle assembly has been permitted to dry out is to install new paddle plates on the shaft.

The leather paddles are supplied for service in two pieces, the lower portion of the paddles being hooked together, and the top portion secured to the shaft by means of a rivet. Different combinations of these half paddle assemblies provide for variation in the parking feature included in all modern Trico Windshield Wipers. Although Trico has built as original equipment windshield wipers with varying paddle and shaft assemblies, some four hundred in number, it is possible to service the paddle itself with these half paddle combinations illustrated. This method of service eliminates the necessity for complicated stock and at the same time ensures the car owner of satisfactory repair when these parts are used

The general demand of both car manufacturers and car owners for a paddle construction which would eliminate the necessity of oiling brought about a change in the design of Trico Wipers in 1931. At that time we introduced the flexible paddle material which we know as "blackhide" and which has proven to be dependable over a period of years.

At the time the blackhide paddle was introduced, the size of the shaft bearing between the cover and the housing was reduced from 3/16" as formerly included with the leather paddles, to 1/8" for the new ones. A change in the construction of the blackhide paddle plates to fit closely around the smaller shaft eliminated interchangeability. As a result, where leather paddles were used in the wiper originally, they must be replaced with leather; where blackhide paddles were used, new blackhide assemblies must replace them.

While the blackhide paddle is considerably more difficult to install, and involves the necessity for more cars in repair, it has tended more and more to throw all the Trico repair work to the authorized service station who is set up with necessary tools and stock of repair material to take care of the more complicated requirements.

The mechanic who attempts to lubricate one of these newer type Trico Wiper with oil finds immediately that the oil will not produce the same results that he was able to secure with the old leather paddles. Because of the piston fit of the blackhide paddle it is necessary to use a lubricant with a larger globular content than that provided by any light oil. Trico uses in original assembly and also provides for service solidified oil known as "Wiperlube".

The introduction of light oil into the wiper will remove the necessary lubricating surface between the paddle and the housing and will result a jerky motion of the paddle. With the lubricant washed clean by the light oil, the paddle has a tendency to "grab" the side walls of the housing as it passes through. Therefore, the definite instructions from the Factory specify that wipers with blackhide paddles must not be oiled at any time.

Three types of blackhide paddle assemblies are used in the heavy duty super motor as illustrated in the center column of the chart. Variations in these three paddles are determined by the position of the parking leather on the paddle plate.

For small wipers, four different blackhide paddle assemblies will provide for a service to any unit built. The same difference in parking leather position determines the type of half paddles to be installed in the unit.

One noticeable exception in half paddle construction occurs in the small type wipers. In 1932 several car manufacturers, including Packard and Chrysler, required for installation on their cars, a full throw wiper with horizontal parking. In order to work out this special design it was necessary to place a special form in both the inside and outside paddle plates of the standard paddle and at the same time leave the lift leather in the standard position.

You will notice by comparison between the standard paddle on the left #55, and the specially formed paddle on the right #70, that the #70 has a very decided difference in the shape of both paddle plates. It is impossible to substitute a #65 for a #70. In handling the service on Packard and Chrysler cars, make sure that the #70 half paddle is used in each case. By referring to your Car Requirements Charts it will be possible for you to determine the exact number of the Renewal Parts set to be used. After the wiper is disassembled however, you will be able to distinguish the difference between the special #70 paddle and the standard #55 paddle.

Through a series of exhaustive tests carried out by the Trico Engineering Department, it has been determined that the average life of a repaired wiper in which a new paddle has not been installed is approximately eleven minutes. We do not expect any one of our Authorized Service stations to repair a wiper that will operate satisfactorily for only eleven minutes, and we know that each service operator who desires to maintain a reputation as a specialist will not take chances by reusing old parts, but will instead install new half paddles and make a fair profit on a job which he knows wil1 stand up.

RENEWAL PARTS SETS

When it is necessary to install a new paddle in a windshield wiper motor, other parts are also necessary in order to provide for ample power and even stroke; such as new gaskets and new valve parts. To simplify the handling of repair service, all half paddles are packed in convenient Renewal Parts Sets supplied in an attractive display cabinet. In the Trico Car Requirements listing you will find under each model the number of the Renewal Parts Set to completely re-operate the wiper. This Renewal Parts Set contains the correct paddle to be used in rebuilding the unit.

* *scive: to cut off (a material, such as leather or rubber) in thin layers or pieces*

S.K.

DIY (do it yourself) repair of windshield wiper motors is made even more difficult by the difficulty of getting repair kits. Kits do occasionally show up on eBay or at swap meets. Gaskets and 'paddle' material are the two big problems. Be sure the kits are fresh and that the gaskets and leather are not dried out.

Windshield Wiper Repair Service
Ficken Wiper Service
132 Calvert Ave
W Babylon, NY 11704
631-587-3332

Our special thanks to John Jenkins for making copies of the TRICO catalogs available to us so that we may share them with you.

NEXT MONTH we will continue with listings, applications and images of the most popular TRICO windshield wiper motors from 1930 through 1942. This information comes from a supplemental TRICO catalog.

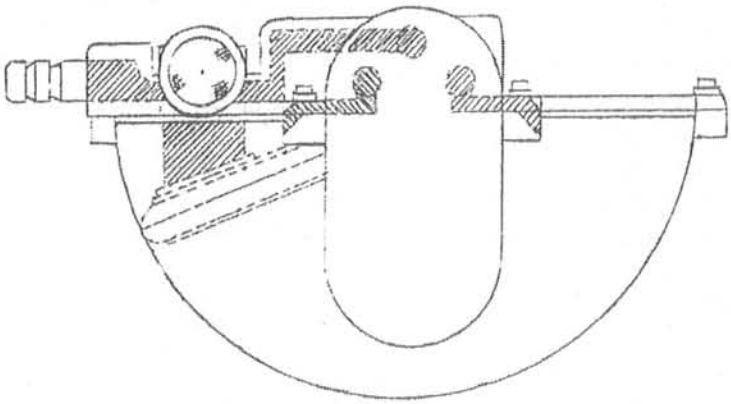
Most of this information has not been available previously. Windshield wipers have sort of remained a mystery with a very little bit of information available. The TRICO catalogs have made this information available to us.

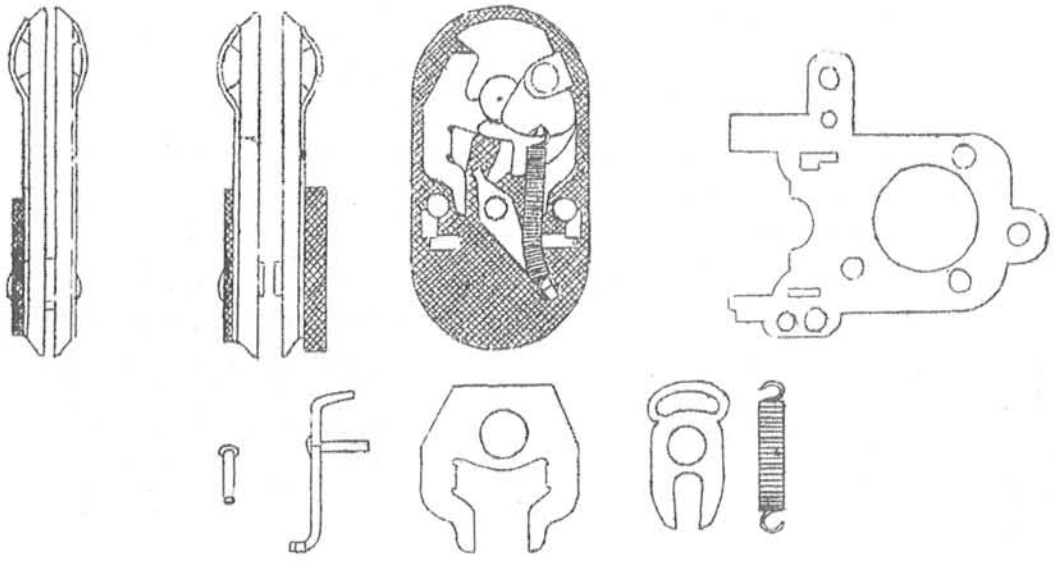
Besides windshield wipers and motors, TRICO also offered accessories: tubing, wiper blades, wiper arms, fans, reserve vacuum tanks, and Clarion horns.

TRICO
Safe Driving
PRODUCTS

MOTOR DESCRIPTION
AND
REPAIR INSTRUCTIONS
Most Popular types of TRICO Windshield Wiper Motors

"RS" TYPE MOTOR





For more information on repair of vacuum windshield wiper motors, we refer you to our January 2010 issue, #402. It is available as a back issue at a cost of $3.50 ppd.

"RS" TYPE MOTORS

The majority of Trico Wipers now in the field are of the RSlt type construction, as illustratrd on the chart (previous page).

You will notice in this "RS" type motor the cover is oval, and is attached to the die oast housing by two screws in the face. All "RS" type wipers regardless of the method by which they are mounted on the car, may be identified for valve type by the shape of this cover.

In the motor symbols used to identify the various "RS" type motors, the last letter indicates the manner in which that particular type is designed for installation on the car: "RSX" -exterior attachment; "RSB" - bushing attachment requiring only one hole in the frame or header board and secured to the car by means of a lock nut, "RSL" - lug type attachment, which requires three holes in the frame or headerboard, one for the driveshaft and two for the attachment screws which are secured to the lugs on the wiper housing. A fourth type of "RS" motor was designed, similar to the "RSX" unit for exterior attachment, but it differed from that wiper in respect to method of control.

The "RSX" motors are the small motors mounted on the outside of the early model Chevrolets from 1928 up through 1930. They were also used on many of the other models with sliding windshields. All of these models were controlled by an operating shutoff valve on the dash panel. When it became necessary to change the control from the dash to the unit itself, a new motor symbol was adapted, indicating the cover control along with the exterior attachment. We therefore produced a motor known as the "CX" which includes the "RX" type mechanism and varies only from the "RSX" motor in the fact that it has a sliding control on the cover.

In order that you may understand the principle of operation which has been employed in the construction of the "RS" type motor and the Factory specified service which we recommend for this unit, we will briefly describe through the means of this chart (page 36) the course of the suction through the wiper, as well as the valve operation. In describing the air passages, imagine that you are seeing a cross section of the wiper, with all superficial parts removed.

Notice the air passage line extending from the hose connection on the left to a hole which is actually located in the center of the die cast cover. While the wiper is operating suction is drawing the air constantly through this center hole. Through a reciprocating action of a slide valve with slotted groove, we direct the flow of vacuum from the center hole to the hole on one side of the cover and then the other. From this reciprocating slide valve motion comes the identification of motor type, "RS". As the wiper is shut off, the flow of vacuum is redirected through the control valve mechanism into a die cast cup on the cover.

Both the leather and the blackhide paddle constructions have been used in "RS" type motors. To locate the number of the Renewal Parts Set to repair any "RS" type wiper, determine the construction of the flexible material, whether blackhide or leather and at the same time notice the position of the parking lift leather, whether it is flat against the cover on a raised lift plate or has two washers under it.

There are certain parts in the valve assembly which are subject to considerable wear and which should be replaced at the time the new paddles are installed in order that an even powerful stroke may be obtained.

In the first place, the slide valve with slotted groove is constructed of soft brass and naturally over a period of years and during a period of operation involving several million strokes, the soft brass will have a tendency to wear thin and decrease the depth of the slot in the valve. With a shallower slot in the valve, the volume of air drawn through is restricted and the wiper cannot work at top speed or with full power unless an entirely new valve is substituted.

To maintain an even, constant pressure against the valve, it is essential that the valve retainer be in absolutely perfect condition. To

eliminate possible difficulty in service and to ensure satisfaction on the part of the customer, this part is also recommended for use in each repair operation performed on an "RS" type motor.

Quite naturally it is essential that new gaskets be installed at the time the wiper is reassembled. There is a general erroneous belief however, that gaskets will repair a windshield wiper. Gaskets have never serviced a wiper, and they never will. Trico wipers are not built to operate on the same principle as the motor in the car. When the mechanic hears the hiss of leaking air in the wiper, it is not caused by defective gaskets, as is the case when the same condition develops in the gasoline combustion motor which powers the automobile.

On the combined action of the spring and kicker assembly used in the "RS" type mechanism depends the eveness of stroke of the wiper. If you expect the unit to start quickly and work efficiently without assistance, the combination action of the kicker and the spring must be accurate, as determined by Factory specifications.

The spring action of the "RS" type mechanism necessitates constant striking of the spring against the cast posts. Naturally wear and loss of tension will result. In the more recent units Trico has changed the length of this spring, #484, and also the length of the kicker. To prevent breakage in the kicker, a new type annealed metal is being used. Do not substitute any haphazard spring which may come to your hands while repairing a unit as too much tension will cause the wiper to stick and perform inefficiently. Too little tension on the spring will prevent it from operating at all. Install in the rebuilt motor both a new spring and a new kicker.

All of the parts described are included in the standard Renewal Parts Sets along with the paddles.

If the service tools are used with intelligence and the necessary repair parts are installed, you are entitled to more money for the job than the average garage man will charge because it is a type of service that he cannot render. You are entitled to a fair profit on a service which is specified by the Trico Factory.

SHORT-CUTS IN HANDLING SERVICE

Reassembly of the spring and kicker used in the "RS" type mechanism will be simplified if the spring is first connected to the kicker at the lower end and both parts held firmly at this point between the thumb and forefinger the remainder of the assembly completed.

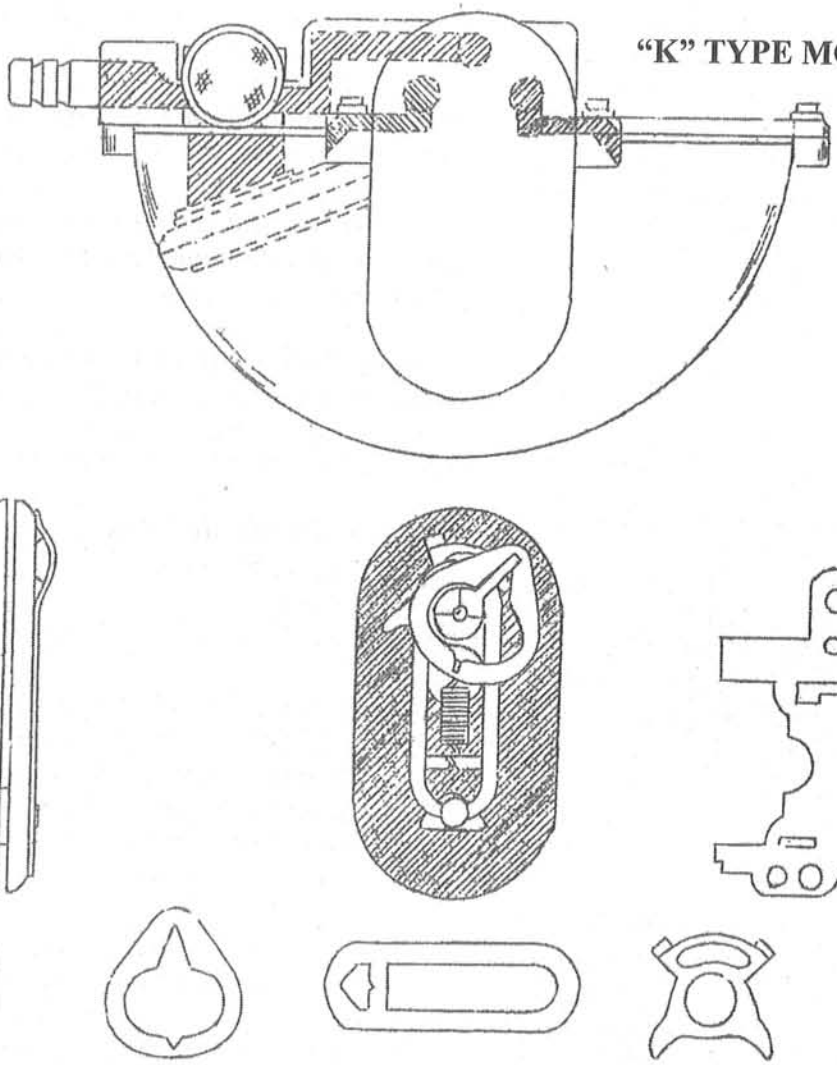
Next, attach the upper end of the spring to the hook on the cam, then press the swivel on which the kicker rides into the opening provided for it in the face of the die cast housing. Be sure in making this installation that the upper end of the kicker is placed between the open arms of the slide valve.

"K" TYPE MOTORS

Trico is constantly striving to perfect and develop windshield wiper construction. One of the most significant results obtained from this effort to improve wiper construction was the development of the "K" type mechanism as illustrated on this chart. The valve operation of these wipers is silent and its construction even more simple than any previously used. The "K" type motors have been identified by that symbol because of the fact that the most important feature in the construction is the die cast kicker which is set in the end of the shaft.

The "K" type motors were first used on General Motors cars in 1932. The units were centrally mounted in the header board and were identified by the heart-shaped cover. During that year the valve operation of these units proved so satisfactory that all Trico Wipers are gradually being changed to "K" type.

The "K" type valve mechanism is not only being used in the units with the heart-shaped cover, but is also being used in the super or heavy duty motors.



The motor symbol for this type is "SK". A majority of the dies for "RS" type housings and covers have been changed over to accommodate the "K" type mechanism. In each of the units of this type we, of course, continue to have the oval valve cover as illustrated on this chart, but in the "K" type motors this stamped cover is designed for snap-on attachment, whereas in the older "RS"' type motors this stamped cover is attached with screws. All of the motors with "K" type mechanism, but with the oval cover similar to the "RS" type are identified by the motor symbol "KS" fo11owed by a third letter indicating the method of attachment – "KSB" for bushing; "KSL" for lug attachment.

If you follow the air passages through the unit, you will notice that the air enters through the hose connection and passes through the shut-off valve to the center hole in the die cast cover in exactly the same manner as in the "RS" type wiper. While the wiper is in operation the vacuum is transferred from the center hole to the hole on one side of' the cover and then the other by means of a slotted valve. This valve is slightly different in shape and construction than the one used in the "RS" type motor, but it performs exactly the same function. Blackhide paddles only have been used in the construction of "K" type motors, so that it is never necessary for you to determine whether blackhide or leather paddlcs should be used in the repair. Always use blackhide.

To rebuild those units and insure powerful, even stroke, it is necessary to replace the valve, the bakelite yoke which is attached to the kicker, the valve retainer, and the spring which

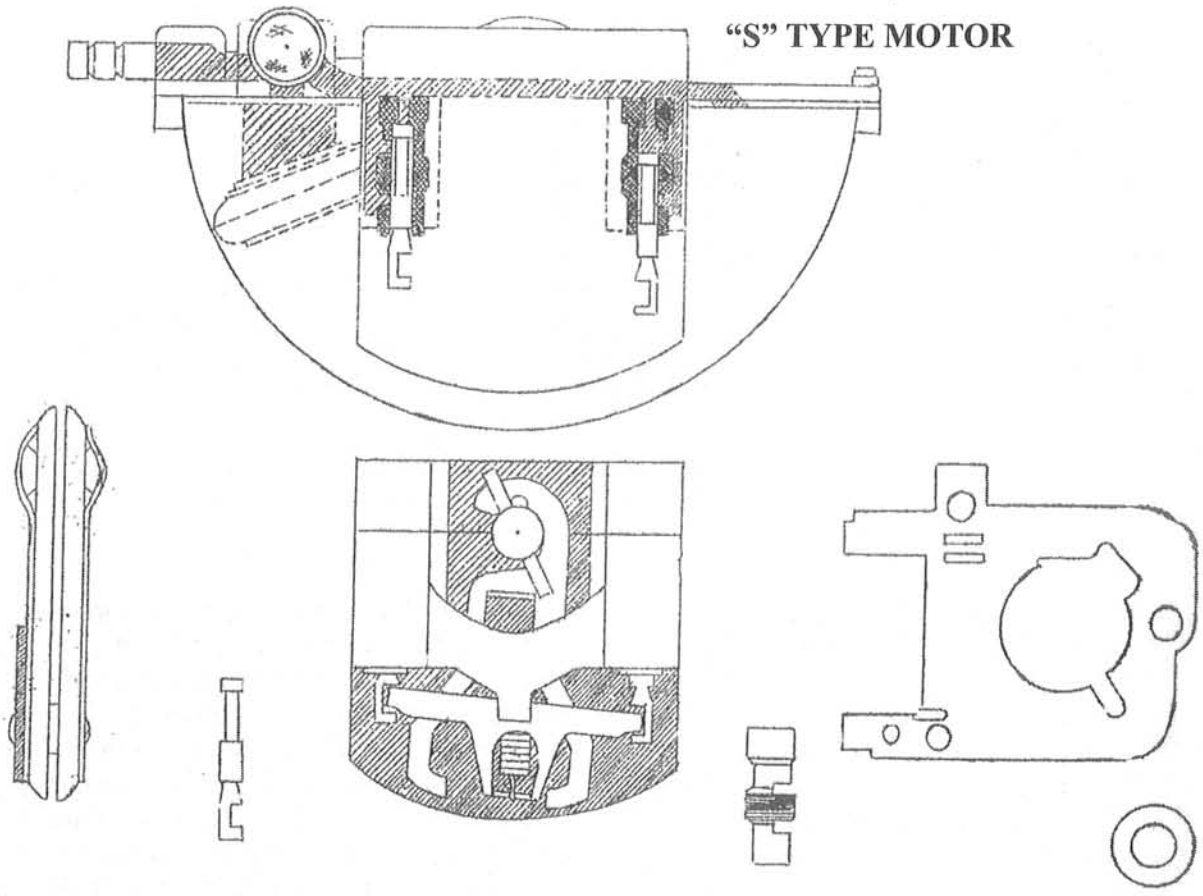
connects the bakelite yoke to the base of the valve retainer. All of these parts are subject to wear and distortion and should be renewed.

Renewal Parts Sets for "K", "KS" and "SK" Motors include the parts detailed on this chart.

SHORT-CUTS IN HANDLING SERVICE

In the assembly of the "K" type mechanism, proceed as follows. After the valve and the valve retainer have been installed in their proper places, insert the kicker in the end of the shaft. Connect one end of the spring to the bakelite yoke and the other end to the slotted groove provided for it in the retainer. Raise the bakelite yoke over the kicker so that it is properly seated. This operation eliminates the necessity of the complicated use of a spring hook to assemble the parts.

"S" TYPE MOTOR



In the "S" type motor a piston type valve action is used. Follow the course of the air column from the hose connection across the top of the wiper and notice that this passage has two outlets which are alternately opened and closed by the up-and-down action of the valve stems. The valve stems themselves are operated up and down by means of the valve mechanism illustrated. Each valve stem is constructed of brass and is set in a brass bushing. A very positive seat must be provided at the time the valve closes against the bushing as illustrated in the valve action on the left side of the motor. After continued operation, wear is bound to occur both in the valve and the bushing at this point so that the wiper will lose power and speed.

As you follow the passage of air through the open bushing on the right and around through a passage in the die cast housing to the, open cavity inside the unit, you can visualize the difficulty which would arise if vacuum were permitted to pass through both outlets at the same time because of defective valves or valve seats. We therefore recommend that in rebuilding all super motors both valves and valve bushings be replaced. This operation should be performed after the die cast cover has been removed from the wiper.

The valve stems may be easily withdrawn at the lower end after the tripper is disconnected. The bushings should be driven out, of the die cast body by using a punch inserted in the lower end. New bushings to replace the old must be started from the top and driven down flush with the face of the die cast body. Start new bushings in the housing so that the open slots in the side of the bushing face toward the slotted opening in the die cast body.

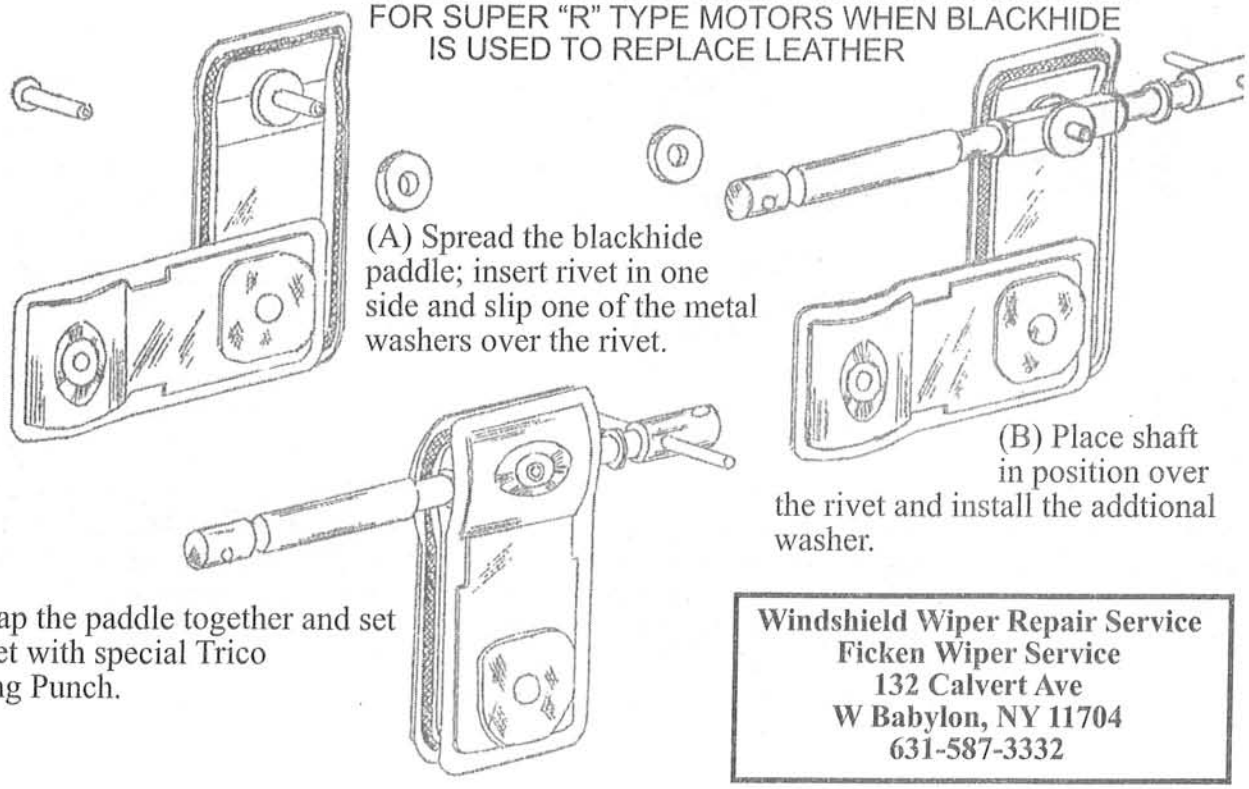
When the wiper is shut off, vacuum is directed to the parking cup on the die cast cover, as is the case in both the "RS" and "K" type motors to provide for the automatic parking feature.

Service on the super motor, as specified by the Factory, involves replacement of the paddle assembly because of the fact that the same wear occurs in the paddle used in these large units as is experienced with the smaller jobs. Paddles for super motors have been built in both leather and blackhide, but in this particular type of motor the size of the bearing between the cover and housing was not changed when the new paddle was introduced. It is therefore possible to substitute blackhide paddles in all cases.

The, section of the wiper shaft to which the paddle is rivated varies in thickness for leather and blackhide paddles. The shafts originally used with leather paddles are narrower at the point of paddle attachment than those supplied with blackhide. In order to substitute the blackhide paddle on the leather shaft, it is necessary to build up the old shaft to the correct width. In Renewal Parts Sets #1071, #1073 and #1074, two metal washers are supplied for this purpose. Install as illustrated.

S.K.

BLACKHIDE PADDLE INSTALLATION INSTRUCTIONS FOR SUPER "R" TYPE MOTORS WHEN BLACKHIDE IS USED TO REPLACE LEATHER



(A) Spread the blackhide paddle; insert rivet in one side and slip one of the metal washers over the rivet.

(B) Place shaft in position over the rivet and install the addtional washer.

(C) Snap the paddle together and set the rivet with special Trico Riveting Punch.